

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
1 April 2004 (01.04.2004)

PCT

(10) International Publication Number
WO 2004/026073 A3

(51) International Patent Classification⁷: **E21B 23/00**

(21) International Application Number:
PCT/US2003/025715

(22) International Filing Date: 18 August 2003 (18.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/412,187 20 September 2002 (20.09.2002) US

(71) Applicant (for all designated States except US): **ENVEN-
TURE GLOBAL TECHNOLOGY** [US/US]; 16200 A Park
Row, Houston, TX 77084 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SHUSTER, Mark**
[US/US]; 19115 Prospect Ridge Lane, Houston, TX

77094 (US). **COSTA, Scott** [US/US]; 2011 Willow
Point, Kingwood, TX 77330 (US). **RING, Lev** [US/US];
14126 Heatherhill Place, Houston, TX 77077 (US).
KENDZIORA, Larry [US/US]; 6518 Williams School
Court, Needville, TX 77461 (US).

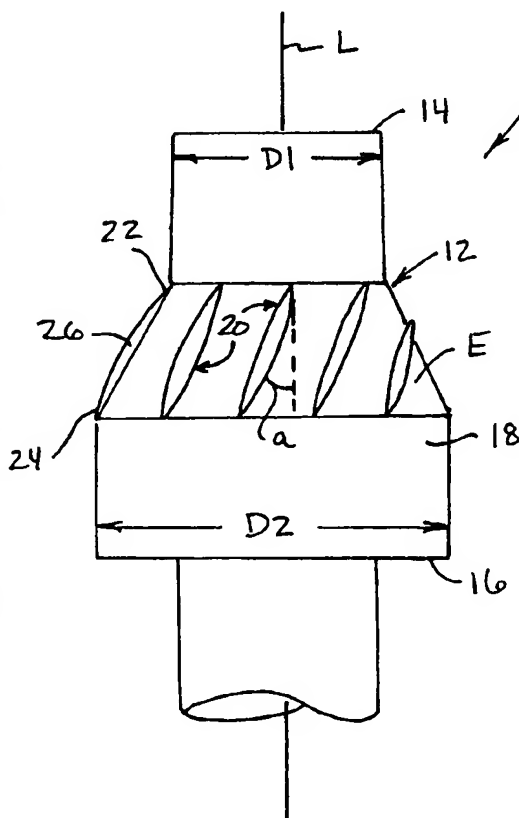
(74) Agent: **MATTINGLY, Todd**; Haynes and Boone, LLP,
1000 Louisiana, Suite 4300, Houston, TX 77002-5012
(US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: **ROTATING MANDREL FOR EXPANDABLE TUBULAR CASING**



(57) Abstract: An expansion mandrel (10) for expanding tubular casing includes a tapered expansion portion having expansion segments (20) which are angularly disposed on an external surface of the mandrel (10). The segments (20) reduce friction and cause the mandrel (10) to rotate in response to the mandrel (10) being moved through the casing during expansion of the casing.

WO 2004/026073 A3

Best Available Copy



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*

(88) Date of publication of the international search report:

17 June 2004

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/25715

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : E21B 23/00 US CL : 166/207,384 According to International Patent Classification (IPC) or to both national classification and IPC																										
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 166/207,384,206,380 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)																										
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 6,325,148 A (Trahan et al.) 4 December 2001 (04.12.2001), Fig. 9 and col. 6, lines 10-35.</td> <td>1-3, 9, 13-15, 17, 20</td> </tr> <tr> <td>X,P</td> <td>US 6,457,532 A (Simpson) 1 October 2002 (01.10.2002), Figs. 20, 22 24, and col. 12, line 27- col. 14, line 9.</td> <td>1-7, 13-17, 19</td> </tr> <tr> <td>Y,P</td> <td></td> <td>8, 10-12, 18, 21-22</td> </tr> <tr> <td>X</td> <td>US 1,597,212 A (Spengler) 24 August 1926, (24.08.1926), Entire document, particularly Figure 1.</td> <td>1-5, 13-16</td> </tr> <tr> <td>Y</td> <td></td> <td>8, 18</td> </tr> <tr> <td>Y,P</td> <td>US Patent Application Publication 2003/0075338 (Sivley), 24 April 2003 (24.04.2003), Fig. 10 and paragraph 0118 on pages 9-10.</td> <td>10-12, 21, 22</td> </tr> <tr> <td>X</td> <td>US 3,039,530 A (Condra) 19 June 1962 (19.06.1962), Fig. 1, col. 1, lines 7-12.</td> <td>1-3, 6, 9</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 6,325,148 A (Trahan et al.) 4 December 2001 (04.12.2001), Fig. 9 and col. 6, lines 10-35.	1-3, 9, 13-15, 17, 20	X,P	US 6,457,532 A (Simpson) 1 October 2002 (01.10.2002), Figs. 20, 22 24, and col. 12, line 27- col. 14, line 9.	1-7, 13-17, 19	Y,P		8, 10-12, 18, 21-22	X	US 1,597,212 A (Spengler) 24 August 1926, (24.08.1926), Entire document, particularly Figure 1.	1-5, 13-16	Y		8, 18	Y,P	US Patent Application Publication 2003/0075338 (Sivley), 24 April 2003 (24.04.2003), Fig. 10 and paragraph 0118 on pages 9-10.	10-12, 21, 22	X	US 3,039,530 A (Condra) 19 June 1962 (19.06.1962), Fig. 1, col. 1, lines 7-12.	1-3, 6, 9
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																								
X	US 6,325,148 A (Trahan et al.) 4 December 2001 (04.12.2001), Fig. 9 and col. 6, lines 10-35.	1-3, 9, 13-15, 17, 20																								
X,P	US 6,457,532 A (Simpson) 1 October 2002 (01.10.2002), Figs. 20, 22 24, and col. 12, line 27- col. 14, line 9.	1-7, 13-17, 19																								
Y,P		8, 10-12, 18, 21-22																								
X	US 1,597,212 A (Spengler) 24 August 1926, (24.08.1926), Entire document, particularly Figure 1.	1-5, 13-16																								
Y		8, 18																								
Y,P	US Patent Application Publication 2003/0075338 (Sivley), 24 April 2003 (24.04.2003), Fig. 10 and paragraph 0118 on pages 9-10.	10-12, 21, 22																								
X	US 3,039,530 A (Condra) 19 June 1962 (19.06.1962), Fig. 1, col. 1, lines 7-12.	1-3, 6, 9																								
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.																										
<table border="1"> <thead> <tr> <th colspan="2">Special categories of cited documents:</th> </tr> </thead> <tbody> <tr> <td>* "A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>* "E" earlier application or patent published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>* "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>* "O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"Z" document member of the same patent family</td> </tr> <tr> <td>* "P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </tbody> </table>			Special categories of cited documents:		* "A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	* "E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	* "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	* "O" document referring to an oral disclosure, use, exhibition or other means	"Z" document member of the same patent family	* "P" document published prior to the international filing date but later than the priority date claimed													
Special categories of cited documents:																										
* "A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention																									
* "E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone																									
* "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art																									
* "O" document referring to an oral disclosure, use, exhibition or other means	"Z" document member of the same patent family																									
* "P" document published prior to the international filing date but later than the priority date claimed																										
Date of the actual completion of the international search 04 March 2004 (04.03.2004)		Date of mailing of the international search report 09 APR 2004																								
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703)305-3230		Authorized officer David J. Eganell Telephone No. 703-308-1113																								

Form PCT/ISA/210 (second sheet) (July 1998)

Best Available Copy